CLAIMS

Please amend the presently pending claims as follows:

1. (Currently Amended) A method for transmitting a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal ~~characterized in that it~~ wherein the method implements a transmultiplexer structure providing:

a modulation step, by a bank of synthesis filters, having 2M parallel branches, $M \geq 2$, each fed by source data and each comprising an expander of order M and filtering means; and

a demodulation step, by a bank of analysis filters, having 2M parallel branches, each comprising a decimator of order M and filtering means, and delivering representative data received from said source data,

said filtering means being derived from a predetermined prototype modulation function.

2. (Currently Amended) The transmission method according to claim 1, ~~characterized in that~~wherein said filtering means of said bank of synthesis filters and/or of said bank of analysis filters are grouped as a polyphase matrix, respectively.

3. (Currently Amended) The transmission method according to claim 2, ~~characterized in that~~wherein at least one of said polyphase matrices comprises a reverse Fourier transform with 2M inputs and 2M outputs.

4. (Currently Amended) The modulating method according to claim 12, ~~characterized in that it~~wherein the method implements a reverse Fourier transform fed by 2M source data, each having undergone a predetermined phase shift, and feeding 2M filtering modules, each followed by an expander of order M, the outputs of which are grouped then transmitted.

5. (Currently Amended) The modulation method according to claim 4, ~~characterized in that~~

~~it~~wherein the method delivers data s[k] such ~~as~~ that:

$$x_m^n(n) = a_{m,n} e^{j\frac{\pi}{2}n}$$

$$x_l^1(n) = \sqrt{2} \sum_{k=0}^{2M-1} x_k^0(n) e^{j\frac{2\pi}{2M}k\frac{D-M}{2}} e^{j\frac{2\pi}{2M}kl}$$

$$= 2M\sqrt{2} IFFT\left(x_0^0, \ldots, x_{2M-1}^0(n) e^{-j\frac{2\pi}{2M}(2M-1)\frac{D-M}{2}} . \right)[l]$$

$$x_l^2(n) = \sum_{k=0}^{m=l} p(l+2kM) x_k^l(n-2k)$$

$$s[k] = \sum_{n=\left\lceil \frac{k}{M} \right\rceil - 1}^{\left[\frac{k}{M}\right]} x_{k-nM}^2(n)$$

wherein $D = \alpha M - \beta$,

with α an integer representing the reconstruction delay;

β an integer between 0 and M-1;

and [.] is the "integral part" function.

6. (Currently Amended) The demodulating method according to claim 15, ~~characterized in that it~~wherein the method implements a reverse Fourier transform fed by 2M branches, themselves fed by said transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data.

7. (Currently Amended) The demodulation method according to claim 6, ~~characterized in that it~~wherein the method delivers data $\hat{a}_{m,n-\alpha}$ such that:

$$\hat{x}'^2_l(n-\alpha) = s[nM - \beta - l]$$

$$\hat{x}'^{1}_{l}(n-\alpha)=\sum_{k=0}^{m-1}p(l+2kM)\hat{x}'^{2}_{l}(n-\alpha-2k)$$

$$\hat{x}'^{0}_{l}(n-\alpha)=\sqrt{2}e^{-j\frac{2\pi}{2M}l\frac{D+M}{2}}\sum_{k=0}^{2M-1}\hat{x}'^{1}_{l}(n-\alpha)e^{j\frac{2\pi}{2M}kl}$$

$$=2M\sqrt{2}e^{-j\frac{2\pi}{2M}l\frac{D+M}{2}}IFFT\left(\hat{x}'^{1}_{l}(n-\alpha),\ldots,\hat{x}'^{1}_{2M-1}(n-\alpha)\right)[l]$$

$$\hat{a}_{m,n-\alpha}=\Re\left\{e^{-j\frac{\pi}{2}(n-\alpha)}x'^{0}_{l}(n-\alpha)\right\}$$

with: D = 2.s.M + d,

wherein: s is an integer;

d is between 0 and 2M-1.

8. (Currently Amended) The demodulation method according to claim 15, ~~characterized in that~~wherein said filtering modules are produced as one of the filters belonging to the group comprising:

transverse structure filters;

ladder structure filters; and

trellis structure filters.

9.(Currently Amended) The modulation method according to claim 15, ~~characterized in that~~wherein said biorthogonal multicarrier signal comprises an orthogonal frequency division

multiplex/offset modulation (OFDM/OM) signal.

10. (Canceled).

11.(Currently Amended)The method according to claim 1, ~~characterized in that~~wherein said biorthogonal multicarrier signal comprises an orthogonal frequency division multiplex/offset modulation (OFDM/OM) signal.

12.(Currently Amended) A method for modulating a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal, ~~characterized in that it~~wherein the method implements a bank of synthesis filters having 2M parallel branches, $M \geq 2$, each fed by source data and each comprising an expander of order M and filtering means, said filtering means being derived from a predetermined prototype modulation function.

13. (Currently Amended) The modulation method according to claim 12, ~~characterized in that~~wherein said filtering modules are produced as one of the filters belonging to the group comprising:

transverse structure filters;
ladder structure filters; and
trellis structure filters.

14. (Currently Amended) The method according to claim 12, ~~characterized in that~~wherein said biorthogonal multicarrier signal comprises an orthogonal frequency division multiplex/offset modulation (OFDM/OM) signal.

15. (Currently Amended) A method for demodulating a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal ~~characterized in that it~~wherein the method implements a bank of analysis filters having 2M parallel branches, each

comprising an expander of order M and filtering means, and delivering representative data received from source data, said filtering means being derived from a predetermined prototype modulation function.

16. (Currently Amended) Apparatus comprising:

a modulating device for modulating a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal, ~~characterized by~~ comprising a bank of synthesis filters having 2M parallel branches, $M \geq 2$, each fed by source data and each comprising an expander of order M and filtering means, said filtering means being derived from a predetermined prototype modulation function.

17. (Currently Amended) The apparatus according to claim 16, wherein the modulating device ~~is further characterized in that it~~ implements a reverse Fourier transform fed by 2M source data, each having undergone a predetermined phase shift, and feeding 2M filtering modules, each following by an expander of order M, the outputs of which are grouped then transmitted.

18. (Currently Amended) The apparatus according to claim 16, further including a demodulation device for demodulating a BFDM/OM biorthogonal multicarrier signal ~~characterized by~~ and comprising:

a bank of analysis filters having 2M parallel branches, each comprising an expander of order M and filtering means, and delivering representative data received from source data, said filtering means being derived from a predetermined prototype modulation function.

19. (Currently Amended) The apparatus according to claim ~~20~~18, wherein the ~~demodulating~~demodulation device ~~is further characterized in that it~~ implements a reverse Fourier transform fed by 2M branches, themselves fed by said transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data.

20. (Currently Amended) A demodulation device for demodulation a biorthogonal frequency division multiplex/offset modulation (BFDM/OM) biorthogonal multicarrier signal ~~characterized by~~ comprising:

a bank of analysis filters having 2M parallel branches, each comprising an expander of order M and filtering means, and delivering representative data received from source data, said filtering means being derived from a predetermined prototype modulation function.

21. (Currently Amended) The demodulation device according to claim 20, further ~~characterized in that it~~ wherein the device implements a reverse Fourier transform fed by 2M branches, themselves fed by said transmitted signal, and each comprising a decimator of order M followed by a filtering module, and feeding 2M phase shift multipliers, delivering an estimation of the source data.